AGRICULTURAL NEWS LETTER

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THIS PUELICATION GIVES INFORMATION on new developments of interest to agriculture based on the work done by chemists and agricultural field men of the du Pont Company and its subsidiary companies.

It also gives reports of results obtained with products developed by these companies in the field, whether the tests are made by field men of the companies, by agricultural experiment stations or other bodies. Also data on certain work done by agricultural stations on their own account and other matters of interest in the agricultural field.

This issue contains:

The announcement by the Grasselli Chemical Co. of the establishment of a Pest Control Division in the New Products Division.

An important review by P. W. Claassen, Professor of Entomology at the Cornell University Experiment Station on the work being done to control the alfalfa snout beetle, a new pest in the United States.

A study of the compatibility of spray and dust combinations used in insect and disease control, by H. F. Dietz, research entomologist of the Grasselli Chemical Co.

Control of cereal diseases in North Carolina by seed treatment as reported by Dr. S. G. Lehman.

Ground Limestone for soil treatment available in outcrops on many farms.

New Control for seed-borne diseases.

The use of marginal and sub-marginal lands for permanent pasture.

Treatment of gladiolus corms by dipping.

Control of gladiolus thrips in California.

Keeping quality of citrus fruits improved by "Cellophane" or aluminum foil wrappers.

Issued by du Pont Company,
Wilmington, Delaware,
F. J. Fyrne, Editor.

GRASSELLI PEST CONTROL DIVISION ORGANIZED

WITH STAFF OF SPECIALISTS IN MANY FIELDS

EDITOR'S NOTE:- A group of chemists, toxicologists, entomologists, plant pathologists, horticulturists and experts in other lines will carry on research and development work. Headquarters at Cleveland, Ohio.

The Grasselli Chemical Company announces a reorganization of their New Products Division, which now will be known as the New Products Department and which will consist of an industrial chemicals division and a pest control division. The headquarters of the New Products Department will be in the Grasselli offices in Cleveland, Ohio. This department will continue to operate as a unit of the chemical department, which is under the direction of Mr. E. A. Taylor.

Mr. E. B. Alvord will have charge of the New Products Department, and the direction of the Pest Control Division will be in the hands of Dr. W. H. Tisdale.

The Pest Control Division constitutes a consolidation of the interests of the E. I. du Pont de Nemours and Company in chemical and biological research and technical sales service in the development of insecticides, fungicides, weed killers, rodent poisons, and other protective agents for agricultural and commercial use.

A staff of chemists, toxicologists, entomologists, plant pathologists, and horticulturists will be responsible for a well balanced program of investigations in these fields.

Dr. H. F. Dietz will have charge of field investigations in entomology. Mr. F. T. Evans will have charge of the commercial development of agricultural products. Mr. C. E. Graves will be responsible for the commercial development of products for use in the industrial field.

The Company wishes to express its sincere appreciation to agricultural and industrial organizations and individuals who have cooperated with the du Pont interests in this field in the past, and to invite future cooperation with its new division.

THE ALFALFA SNOUT BEETLE

BRACHYRHINUS LIGUSTICI L.

Destructive insect discovered in New York, the first known occurrence of this bettle in America. Found in an area comprising about forty square miles, within fifteen or twenty miles of the extensive alfalfa region of the state.

By: P. W. Claassen, Professor of Entomology,
Cornell University Agricultural Experiment Station.

In October 1933, Henry L. Page, County Agent of Oswego County, reported the dying out of more or less extensive areas in several alfalfa fields near the city of Oswego. An examination of the affected plantings by representatives of the State College of Agriculture revealed that the destruction of the alfalfa plants was caused by grubs of a snout beetle, determined by specialists of the Bureau of Entomology of the United States Department of Agriculture as Brachyrhinus ligustici Linn. This is the first known occurrence of this insect in America. Its presence is considered a serious menace to the clover and alfalfa industry of New York State.

This insect has an evil reputation in Europe as a pest of alfalfa and clover because of the depredations of the grubs on the roots of these plants. Heavy infestation causes complete destruction of the roots and the death of the alfalfa. The adults or beetles feed on a large number of cultivated plants and cause serious injuries to berries, grapes and young fruit trees.

The area in which the beetle was first discovered comprises about forty square miles and is located only about fifteen or twenty miles north of the extensive alfalfa growing region of the state. During the past summer new infestations have been discovered along the eastern shore of Lake Ontario as far north as Sacketts Harbor.

Investigation Started

Last spring the State Legislature appropriated a small sum of money for the investigation of this new pest and during the past season, we have learned a great deal about the habits of this insect and have been getting a few leads on control measures. The main damage to alfalfa is done by the larvae or grubs of the weevil. The eggs are laid on the ground during the early part of the summer and the larvae burrow into the ground where they feed upon the alfalfa roots, girdling them completely and usually cutting them off entirely. This kills the plants or weakens them so that they are unable to continue growth.

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We find as many as two hundred larvae per square foot area, and they penetrate the soil to a depth of two feet or more. These larvae are white, about one half inch long when fully grown, and resemble somewhat the ordinary white grubs. By late fall most of the larvae have attained their full growth and they winter over in the soil and transform into pupae the following spring. From these pupae the snout beetles emerge and thus complete the life cycle. The adults are grayish-black in color, about one half inch in length and the head is prolonged into a long snout at the end of which are located the chewing mouthparts.

So far as known all of these insects are females and each one is capable of laying several hundred eggs. This type of reproduction where all of the insects are females is known as parthenogenesis. This is a very important factor in the spread of this insect to new fields for every single specimen is capable of starting a new infestation. Fortunately the adults cannot fly for the ordinary wings which are used in flight by beetles are not developed in this species and the wing covers are sealed on top of the body. However, the beetles are good crawlers and capable of traveling considerable distance.

Methods of Control

Since we know of no practical method of getting poisons or fumigants to penetrate the soil to a depth of several feet it appears that our control methods will have to be directed largely to killing adults as they emerge in the early spring. This we have attempted to do by means of trench barriers around the infested fields where the beetles fall into the ditch and migrate along until they fall into post holes that have been dug at intervals. New seedlings may also be protected by means of barriers such as naphthalene, tar oil, or others. We have also had some indication of success with spraying the new growth of alfalfa with arsenicals for the beetles are voracious feeders when they emerge. Possibly poison baits would also be effective but we have not yet had an opportunity to try them. Since every adult is capable of laying so many eggs any means of control which would reduce their numbers would help to check the spread of the insect as well as the destruction which the following generation would cause.

Since we have only had four or five months to study this new pest, we feel that all our information must be looked upon as of a preliminary nature and it will be several years before we can make any prediction as to how efficiently this insect may be controlled. Since the weevils kill out entire fields of alfalfa within a single season, it is one of the foremost enemies of one of our best forage crops - alfalfa.

THE COMPATIBILITY OF SPRAY AND DUST COMBINATIONS USED IN INSECT AND DISEASE CONTROL

By: Harry F. Dietz, Research Entomologist,
Grasselli Chemical Company,
Cleveland, Ohio.

In the use of combination sprays or dusts on plants for the control of insects and plant diseases there are always three factors that most be considered. These are as follows:

1. The safety of such combinations to the plants.

2. The adequacy of such combinations in the control of the insect pest or pests involved.

3. The adequacy of such combinations in the control of the disease or diseases in question.

These factors may be included under the general heading of compatibility which means the suitability of the various ingredients existing in or mixed together in the same spray or dust combination.

Another point that must be considered in connection with compatibility is the previous treatments that the plants have received. For example if plants have been sprayed with Bordeaux mixture and are covered with the spray residue, serious burning would in most cases result, if these plants were fumigated with cyanide. Likewise, serious burning would likely occur if plants bearing a noticeable sulfur residue were sprayed with oil or if arsenical sprays are followed too closely by fluorine sprays or dusts, severe burning may occur.

Compatibility also involves the use of so-called spreaders, wetting agents and stickers with insecticides and fungicides.

The problem is an extremely complex one and involves certain physical reactions such as; (1) the adhesion of the combination to the foliage; (2) the wetting of insects or the fungus and the foliage, stems and leaves of the host plant; or (3) the spreading over the leaves, the fungus or the insects in a uniform film.

On the other hand, since spray materials are chemical compounds or frequently mixtures of chemical compounds, chemical reactions may take place if one material is mixed with another. Whether chemical reactions take place depends on the nature of the two or more chemical compounds that are mixed together and the conditions to which the mixture is subjected.

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But to complicate the matter still more, theoretical considerations and practice do not always seem to coincide. Materials that theoretically should be compatible are frequently not so and cause serious plant injury. Others whose performance in the control of insects or diseases should be impaired in certain combinations perform sufficiently well to merit recommendation.

Hence it is not unusual to find competent authorities in disagreement over the use of certain combination sprays.

Used under many conditions

Such disagreement may have its basis in the fact that sprays and dusts are used under a wide range of conditions, in which the light, the temperatures and relative humidity and rainfall may have been entirely different. Likewise, the kind of plant or the kinds of insects or diseases on which tests were made may have been different.

Any assumptions that are made in connection with the compatibility of spray or dust mixtures may be wrong. For example, to assume that a certain spray is safe on roses because it did not injure tender snapdragon seedlings is fallacious. Or to assume that, because a certain combination is safe on potatoes, it is equally so on tomatoes is equally erroneous. Even to assume that because a given combination is safe on one variety of plant, it will be equally safe on another variety of the same kind of plant, is treacherous. There is evidence to support the idea that even within a variety, certain strains will be found that are resistant or susceptible to injury. This is not an unusual phenomena when one stops to consider the abundant evidence that is amassed regarding the susceptibility and resistence of varieties and strains of plants to plant disease and even insect attack. In the last analysis, this particular problem is a physico-chemical one.

Because a certain spray kills one species of aphid at a certain low concentration is no reason for assuming it will kill all species at the same concentration; or because it kills thrips and red spider does not necessarily imply that it will kill mealy bugs.

If incompatible mixtures are used anything may happen. The extremes would be that the plants would be severely injured and neither insects nor diseases controlled or that no injury would occur to the plants nor would the insects and diseases be affected.

At the present time, there is no combination dust or spray mixture that will control all insects and diseases or will be equally safe on all kinds of plants. Such a combination, although long sought after, seems as remote at present as ever.

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What can the grower do?

Since new insecticides are being introduced on the market and new combinations are constantly being proposed by the investigators, what can the grower do?

He has several alternatives. First he should never try a material or a new combination with which he is not familiar on too extensive a scale. He should make tests on a few (from 12 to 25) plants before applying a spray or dust to all the stock and should allow at least four days to elapse before deciding that any new combination is safe.

He should read the directions on containers carefully and should use materials only as directed.

He should consult such investigators as are conversant with the problem. For example, in the case of ornamental and flowering plants the Department of Floriculture at the Ohio State University makes large numbers of tests every year on new products and new combinations in order to determine their safety to greenhouse and ornamental plants and their effectiveness on such insects and diseases as may be present on such plants. The investigators of insects and diseases attacking greenhouse flowering and ornamental plants at the Ohio Experiment Station conduct control investigations on the more important or generally prevalent and troublesome of these pests. In the course of these investigations they test combination sprays and dusts. All authorities cooperate for the benefit of the grower.

Some tabulations

A brief tabulation of some compatible and incompatible combinations for greenhouse and ornamental plants follows. Most new products must be necessarily omitted because data relating to their compatibilities are still meager.

Lime - sulfur - Must be used with care in greenhouse.

Compatible with - Lead arsenate; nicotine sulfate. May be used with calcium and manganese arsenate if two or three times as much lime as arsenical is used.

Incompatible with - Fluorine compounds; Paris Green; Bordo; rotenone, pyrethrum, derris, and cube extractives; soap; and oil sprays.

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Wettable Sulfur - Considerable number on market.

Compatible with - Fluorine compounds depending on wetting agent incorporated; lead arsenate; calcium and manganese arsenate if sufficient lime is added; nicotine sulfate and freebase nicotine; rotenone; pyrethrum, derris and cube extractives; and soaps.

Incompatible with - Oil sprays; Paris Green; and Bordo.

Flotation Sulfurs:

Compatible with - Fluorine compounds; lead arsenate; calcium and manganese arsenate if two or three times as much lime as arsenical is used; nicotine sulfate and freebase nicotine; rotenone; pyrethrum; derris, and cube extractives.

Incompatible with - Oil sprays; Paris Green, Bordo.

Other Sulfurs - Especially sodium and potassium sulfide; acid or hydrophilic colloidal sulfurs. These are reactive materials and should be used alone except where specifications call for a combination. However, hydrophilic colloidal sulfur is compatible with fluorine compounds and lead arsenate.

Bordeaux Mixture -

Compatible with - lead, calcium, and manganese arsenate and also Paris Green; oil sprays if properly mixed; nicotine sulphate.

Incompatible with - ordinary soaps and all sulfur sprays; Cyanide gas fumigation if residue is on plants.

Compatibility in doubt - fluorine compounds; rotenone; pyrethrum, derris, and cube extractives.

Further Tabulations

Mineral Oil Sprays -

Compatible with - nicotine (free base) and nicotine sulfate; rotenone; pyrethrum; derris; and cube extractives; lead arsenate and probably both calcium and manganese arsenate in proper combination with lime; Bordo if the two are properly mixed together.

Incompatible with - any sulfur sprays; dangerous if sulfur spray residue is on foliage.

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Soaps -

Compatible with - nicotine sulfate; and with rotenone; pyrethrum, derris, and cube extractives if mixtures are used freshly prepared.

Incompatible with - lime sulfur, Bordo, arsenicals, fluorine compounds.

An exception seems to be one of the pine tar spray soaps which is apparently compatible with lead arsenate and barium fluosilicate. Potash fishoil soap is used as an adhesive for Bordo combinations.

Limes -

Special mention of limes should be made. The type of lime to be added to lime-sulfur or sulfur-arsenical combinations should always be high calcium lime.

The type of lime generally recommended for making Bordo is high magnesium lime.

The influence of the two kinds on the effectiveness of arsenicals is still controversial. Excessive quantities impair the insecticidal efficiency of arsenicals.

Lime reduces the efficiency of rotenone, pyrethrum, derris, and cube dusts and sprays.

Lime increases the efficiency of nicotine sulfate sprays and is the best carrier for nicotine dust.

The use of lime with fluorine dusts is still questionable.

The foregoing tabulation of compatibilities indicates the incompleteness of the knowledge of this subject in spite of the great amount of work that has been done.

Much information on the compatibilities of the more recently introduced insecticides and fungicides is needed. If the grower attempts to obtain information on the subject, he should realize the nature of the problem and above all he must remember never to try a combination spray or dust on a whole block of plants unless previous experience or information of the experiences of others has taught him that such combination is safe to the plants and effective against the pests under a wide range of conditions.

It is always better to be safe than sorry.

CONTROL OF CEREAL DISEASES BY SEED TREATMENT

REPORTED BY NORTH CAROLINA PLANT PATHOLOGIST

EDITOR'S NOTE:- An interesting and informative discussion of cereal diseases and their control appeared in the October 1 issue of the News and Observer, Raleigh, North Carolina. It was contributed by Dr. S. G. Lehman, plant pathologist, North Carolina Experiment Station, Raleigh.

Dr. Lehman States: "Diseases annually take large toll of the cereal grains harvested in North Carolina. Smuts, rusts, scab and other diseases not only reduce yields but lower the quality of the harvested grain.

"At this time, when acreage for planting is being reduced, the grower will have and can well afford to give more time to the production of a higher quality of seed. One important step in the accomplishment of this is the control of diseases. Some of the most destructive of the cereal diseases which reduce yield and quality may be controlled by seed treatments which are both simple and inexpensive."

This authority discusses, in detail, smuts and scab of oats, wheat and barley; and barley stripe. He points out also the advantages and, in some cases, the disadvantages of the uses of such common chemicals as formaldehyde, "blue stone" and copper carbonate for seed treatments.

Dr. Lehman describes oat seed treatment with formaldehyde and adds: "Another material which gives excellent control of oat smut is on the market under the trade name of New Improved Ceresan.* This is purchased and applied to the seed in the form of a very fine dust and does not require wetting of the grain. One-half ounce of dust is thoroughly stirred into each bushel of grain, either by rolling it in a closed barrel or by shoveling it over two or three times. Sack the grain or shovel it into a conical pile, keeping it at least 24 hours, but no longer than two or three weeks, before sowing. One pound will treat 30 bushels of oats. The cost of the chemical per bushel of grain treated will be approximately one cent for formaldehyde or two cents for New Improved Ceresan."

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On the subject of wheat smut treatment, Dr. Lehman states: "Practical control of covered smut may be had by use of the old fashioned blue stone or by the use of formaldehyde.....However, both of these chemicals cause considerable injury to wheat seed, and for that reason have been replaced by less injurious but equally effective materials. These are copper carbonate and New Improved Ceresan.

"Using the latter material the treatment of wheat is exactly as described for the control of oat smut. The copper carbonate is also applied as a dust, but at the rate of two to three ounces of dust per bushel of wheat, the lesser amount when smut infestation is light. Since this material is non-volatile, each grain must be coated with dust. For thorough dusting and satisfactory control of smut with this material some form of rotary barrel type duster is required. The cost of copper carbonate per bushel of treated grain will vary from three to six cents depending on the rate of application and the local cost of the dust."

With reference to control of barley diseases, the writer says: "Almost perfect control of covered smut on all varieties of barley can be obtained by treating the seed with formaldehyde or with New Improved Ceresan as recommended for oat smut. Loose smut in certain of the bearded varieties is also controlled by these treatments. However, in some varieties of barley, particularly the beardless variety commonly grown in this state, loose smut is only partially controlled by these chemicals, treatment of the seed with hot water being necessary for complete satisfactory control."

According to Dr. Lehman, barley stripe is becoming more and more prevalent. "Fair control of this disease is obtained by the use of formaldehyde," he says, "and almost perfect control by New Improved Ceresan as recommended for covered smut.

"The cereals, wheat, oats, and barley are all attacked by a disease called scab. This disease kills numbers of seedlings. It blights the heads of plants approaching maturity and it is caused by a fungus which also occurs on corn. If these cereals are to be sowed on corn land, all corn stalks should be plowed under and well covered with soil. The seed for sowing should be run through a fanning mill to blow out all light, shriveled, "scabby" kernels. Treating the cleaned seed with copper carbonate or with New Improved Ceresan will increase the amount of control obtained.

(*) Ethyl mercury phosphate.

GROUND LIMESTONE FOR SOIL TREATMENT AVAILABLE IN OUTCROPS ON MANY FARMS

In certain localities farmers obtain all the ground limestone they require for treating fields and pasture lands from outcrops of limestone ledges and boulders. The usual practice is to blast the limestone and have it crushed by portable power crushers which are moved from one locality to another by the operators.

Most county agricultural agents and numbers of farmers are familiar with the simple blasting methods followed. The three practices are (a) mudcapping, (b) snakeholing, and (c) blockholing. In general, mudcapping consists of piling loose dynamite on the limestone to be blasted and covering it with a little mound of clay; snakeholing means digging out the earth at the face or under a ledge or boulder to receive the charge of explosive, while blockholing is the making of a hole in the limestone with a hand drill and hammer or a power drill.

It is important, however, that before attempting to do blasting those unaccustomed to the use of explosives consult some one who has had experience in limestone "shooting." Considerations of safety, efficiency and economy make this precaution necessary.

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U. S. DEPARTMENT OF AGRICULTURE RECOMMENDS

NEW CONTROL FOR SEED-BORNE BARLEY DISEASES

EDITOR'S NOTE:- Because of the fact that barley is a new crop for an increasing number of farmers, many growers are not familiar with the common diseases which attack this cereal while comparatively few are informed on the subject of control of these diseases. It, therefore, is important for growers to know that after intensive study of the subject, Department of Agriculture authorities have ascertained that most of the important barley diseases can be controlled by treating the seed with an organic mercury disinfectant. This is known by the trade name, "New Improved Ceresan."

That certain major seed-borne diseases of barley can be controlled by a new seed treatment is important information made public by the United States Department of Agriculture in Miscellaneous Publication 199, titled, "Barley Diseases Controlled by Seed Treatment."

Besides describing other treatments for seed barley, the leaflet states:

> "One of the commercial organic mercury dusts (*) has been found to control covered smut, black loose smut, stripe and seedling blight, and is recommended for barley seed treatment. (Consult your county agricultural agent for further information). It costs about two cents for each bushel of seed. It is applied at the rate of only one-half ounce per bushel either by means of a rotary seed treater or by the shovel method. After treatment the grain should be stored in sacks or in a covered pile for not less than one nor more than ten days."

(*) "Ethyl mercury phosphate is its essential ingredient."

THE USE OF MARGINAL AND SUB-MARGINAL LANDS

FOR PERMANENT PASTURE OFFERS POSSIBILITIES

EDITOR'S NOTE:- An obvious and valuable use for land thrown out of cultivation is for pasture, agricultural authorities point out. This use, it is believed, will in many instances, offer a solution of the problem of economic utilization of acreage that falls within marginal or sub-marginal classification.

A resume of thirteen years research, from which has been developed a system of pasture improvement, is given in Bulletin 190, Storrs, Connecticut, Agricultural Experiment Station. The quotations below are from this bulletin of which B. A. Brown, M. S., Associate Agronomist, is the author.

"In 1919 when this Station first made preparations for a pasture experiment, the need for investigating this important subject had been apparent in Connecticut, as well as other northeastern states, for many years. The ordinary permanent pastures had become so unproductive that prominent dairymen placed very little value on them as a source of feed for their milking cows. The relatively large area of this type of pasture in Connecticut suggested that studies of its improvement was the most important problem. Therefore, our first project was laid out on a rather typical, brush-grown, rocky, rundown permanent pasture. The results from this original experiment have shown both the weak and the strong points of permanent pastures and also established the need for several other experiments to answer the many questions involved in an adequate grazing program.

"Grazing of differently fertilized pasture plots for ten years has shown very clearly that rundown pasture can be improved greatly by spreading the proper fertilizers on the surface without any tillage or seeding operations. Lime, nitrogen, phosphoric acid and potash are the four plant nutrients usually added to soils to increase the production of crops. On the experimental pastures, carriers of these nutrients have been tested alone and in various combinations.

"During the second year after fertilization, it became evident that no noteworthy improvement had resulted from any combination of fertilizers that did not include superphosphate. At no time has there been cause for changing this observation. On the other hand, the

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effects of potash in any combination have been negligible. But either limestone or carriers of nitrogen, when applied with superphosphate, have given large increases above superphosphate alone. Limestone has not increased the production of plots treated with both superphosphate and nitrogen carriers, while nitrogen has added appreciably to the large yields from the superphosphate-limestone pastures.

"If the average increases are stated as percentages of the production of the unfertilized plot, we have:

"Superphosphate	80% increase
"Superphosphate and limestone	128% increase
"Superphosphate and nitrogen	166% increase
"Superphosphate, limestone and double nitrogen	197% increase."

TREATMENT OF GLADIOLUS CORMS BY DIPPING

TO DESTROY INSECTS AND PREVENT DISEASES

EDITOR'S NOTE:- The excerpts below are from the Ohio Agricultural Experiment Station Bulletin 537, August 1934, titled, "The Gladiolus Thrips," by E. A. Herr. Since the quoted matter covers but part of the research work done and is incomplete, even as to the dipping phases, it is suggested that those interested obtain a copy of the bulletin.

"Inasmuch as the gladiolus thrips, under Ohio conditions, hibernates almost entirely, if not exclusively, on corms in storage, the most important source of field infestation will be removed if an effective control measure is applied to the corms before planting.

"The treatments of mercuric chloride (one ounce - seven and one half gallons) Semesan (one ounce - three quarts) for periods of three to seven hours, respectively, gave one hundred percent mortality. The corms which were treated with Semesan, Calogreen and calomel retained considerable amounts of the materials, and it is probably that the residual effect aids materially as a protection against reinfestation.

"The Semesan treatment killed one hundred percent of the insects, according to the results of both the first and second examinations. In all the tests where Semesan was employed, it gave one hundred percent kill, and, therefore, this material may be recommended with assurance as a control for the thrips on the corms.

"If treatment is delayed until spring, either mercuric chloride or Semesan should be used, because both of these mercurial dips have additional fungicidal value against gladiolus diseases. In the event fall fumigation fails to control, the use of a dip in the spring is a cheap insurance for the summer flower crop.

"The largest number of flowers was obtained from the corms treated with Semesan, with an average of twenty-five per plot; whereas the smallest number occurred in the check, with an average of eighteen.

"All treated corms, except those on which naphthalene flakes were used, bloomed earlier than the untreated checks. On these plots the blooms appeared simultaneously. Inasmuch as earliness of blooming usually is of advantage to the grower, it would seem that treatment with some of the materials could be considered of value aside from the standpoint of thrips control."

GLADIOLUS THRIPS IN CALIFORNIA CONTROLLED BY FUMIGATION, CHEMICAL DIP AND NEW SPRAY

By: A. F. Swain, The Pacific R. & H. Chemical, Corporation

The gladiolus thrips, first discovered in the United States in 1931 and in Southern California in 1932, has spread to practically all parts of the country where gladiolii are grown. In 1933 the thrips practically ruined the commercial gladiolus industry in Southern California. This past summer the University of California Citrus Experiment Station assigned one of their Entomologists to the problem of devising control methods. The results of his work have recently been released in News Letter No. 9 from that station.

Treatment of corms by fumigation with hydrocyanic acid, mixture with napthalene flakes, dipping in mercuric chloride solution or immersion in hot water, have all proved of value.

Dozens of spray formulas have been tried extensively, and although various contact insecticides kill the thrips that are actually contacted, none results in satisfactory control. This is due to the habit of the thrips of hiding within the leaf sheaths where they cannot be reached by the spray. However, it was found that a poisoned sugar solution as a spray was very satisfactory and where thorough application was made every week to ten days upwards of 90% perfect flowers were obtained. In neighboring unsprayed plantings, no marketable flowers were obtained.

The most satisfactory, safest and most economical formula is:-

Manganese arsenate	4 lbs.
Brown Sugar	66 "
Water to make	100 gals.

The only other insecticide which gave control of the thrips was Paris Green in the sugar solution, but due to the fact that it does not stay in suspension well and that in districts of relatively high humidity it often burns the gladiolii severely, it is much less satisfactory than Manganese Arsenate.

Note:- Manganese Arsenate is an insecticide developed by the Grasselli Chemical Company and marketed under the trade name of MANGANAR.

KEEPING QUALITY OF CITRUS FRUITS IMPROVED BY "CELLOPHANE" OR ALUMINUM FOIL WRAPPERS

"The effect of different types of wrappers, such as waxed paper, aluminum foil, and Cellophane, on the keeping quality of citrus fruits was studied by the Florida station with quite definite results. Aluminum foil and Cellophane were clearly and consistently superior to the common tissue and oil papers in that they tended to repress loss of moisture from the fruit and kept the fruit in a firm sound condition for long periods. Unwrapped or paper-wrapped fruit under like storage conditions lost weight rapidly and soon shriveled, particularly around the stem end." Report of the Agricultural Experiment Stations, 1933.